Whitehorse
THE WILDERNESS CITY

Yukon
Community Services
Building and Safety
Standards Branch

April 1, 2017

Construction Industry, Designers, Contractors and Suppliers providing services in Yukon

Advisory #3 – Part 3 Buildings – Stairs, Handrails & Guards

The National Building Code of Canada 2015, (NBC) which is adopted in Yukon, under the Yukon Building Standards Act, contains several provisions that apply to the construction of Stairs, Handrails and Guards for Commercial, Industrial, Institutional and Residential Type Construction, which are regulated under Part 3 of the 2015 NBC. We are alerting you to the need for building owners, as well as their designers, builders and material suppliers on their behalf, to comply with the requirements of the 2015 NBC regarding the construction of Stairs, Handrails and Guards in all Part 3 Buildings.

Although the Territory adopts the National Building Code (NBC), it is administered within Whitehorse by the City of Whitehorse, Building Officials and in all other parts of Yukon; the Yukon Government, Building Officials administer it. This enclosed Advisory #3 deals with the construction of Stairs, Barrier-Free Ramps, Handrails and Guards in all buildings that are governed under Part 3 of the 2015 NBC. Advisory #1 deals with the construction of stairs, handrails, and guards for single family dwellings or a house with a secondary suite. Advisory #2 includes a summary of the applicable Part 9, 2015 NBC provisions for the construction of stairs, handrails and guards for all other Part 9 Buildings other than single family dwellings or a house with a secondary suite.

We hope that this advisory will help eliminate confusion about the construction requirements of Stairs, Handrails and Guards for all Other Part 9 Buildings and will encourage uniform application of the 2015 NBC requirements throughout Yukon. Please feel free to make copies of this advisory available to your customers as you see fit. Your assistance in achieving these goals is greatly appreciated.

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Building Standards – Advisory #3

April 1, 2017

Part 3 Buildings – Stairs, Handrails & Guards for Part 3 Buildings

Compliance with the Building Standards Act and Regulations are addressed in this advisory. The National Building Code of Canada 2015 (NBC) is adopted by the Building Standards Act. Words in *italics* are defined in the 2015 NBC.

Note: This Advisory #3 applies to the construction requirements under Part 3 of the 2015 NBC for stairs, handrails and *guards* in all Commercial, Industrial & Residential Type Construction which serve more than a Single Family *Dwelling Unit* [Duplexes to Apartment *Buildings* which exceed 600 m² (6500 ft²) In *Building Area* or 3 Storeys in *Building Height*], as these are all regulated under Part 3 of the 2015 NBC and shall comply with the following:

Part 3 of the 2015 NBC for Stairs Ramps, Handrails and Guards

Article 3.3.1.14. Ramps and Stairways

1) Except as permitted by Sentence (2), Article 3.3.4.7. and Subsection 3.3.2., ramps and stairways that do not serve as *exits* shall conform to the requirements for *exit* ramps and stairways stated in Sentence 3.4.3.2.(8) and Articles 3.4.3.4., and 3.4.6.1. to 3.4.6.9.

2) Ramps and stairways that serve *service rooms*, *service spaces* or *industrial occupancies* need not comply with Sentence (1), provided
a) they are intended only for occasional use for servicing equipment and machinery, and
b) they do not serve as *exits*.

Article 3.3.1.15. Exterior Passageways

1) An exterior passageway leading to a required *exit* shall conform to the requirements of Section 3.4. for exterior *exit* passageways.

Article 3.3.1.16. Tapered Treads in a Curved Flight

1) *Flights* of stairs shall consist solely of
a) straight *flights*, or
b) curved *flights* complying with Sentence (2).

2) *Tapered treads* in a curved *flight* that is not required as an *exit* shall have
a) a minimum *run* of 150 mm(6"),
b) a *run* not less than 280 mm (8") when measured at a point 300 mm (12") from the centre line of the handrail at the narrow end of the tread, and
c) a riser conforming to Sentence 3.4.6.8.(2).

3) *Tapered treads* shall have a consistent angle and uniform *run* and rise dimensions in accordance with the construction tolerances stipulated in Article 3.4.6.8. when measured at a point 300 mm (12") from the centre line of the handrail at the narrow end of the tread.

4) All *tapered treads* within a *flight* shall turn in the same direction.

Article 3.3.1.18. Guards

1) Except as provided in Sentence (5) and Article 3.3.2.9., a *guard* not less than 1 070 mm (42") high shall be provided
a) around any roof to which access is provided for purposes other than maintenance,

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b) at openings into smoke shafts referred to in Subsection 3.2.6. that are less than 1 070 mm (42") above the floor, and
c) at each raised floor, *mezzanine*, balcony, gallery, interior or exterior vehicular ramp, and at other locations where (see Note A-9.8.8.1.)

i) the difference in elevation is more than 600 mm (24") between the walking surface and the adjacent surface, or
ii) the adjacent surface within 1.2 m of the walking surface has a slope of more than 1 in 2.

A-9.8.8.1. Required Guards. The requirements relating to guards stated in Part 9 are based on the premise that, wherever there is a difference in elevation of 600 mm (24") or more between two floors, or between a floor or other surface to which access is provided for other than maintenance purposes and the next lower surface, the risk of injury in a fall from the higher surface is sufficient to warrant the installation of some kind of barrier to reduce the chances of such a fall. A wall along the edge of the higher surface will obviously prevent such a fall, provided the wall is sufficiently strong that a person cannot fall through it. Where there is no wall, a guard must be installed. Because guards clearly provide less protection than walls, additional requirements apply to guards to ensure that a minimum level of protection is provided. These relate to the characteristics described in Notes A-9.8.8.3., A-9.8.8.5.(1) and (2), A-9.8.8.5.(3) and A-9.8.8.6.(1).

Examples of such surfaces where the difference in elevation could exceed 600 mm (24") and consequently where guards would be required include, but are not limited to, landings, porches, balconies, mezzanines, galleries, and raised walkways. Especially in exterior settings, surfaces adjacent to walking surfaces, stairs or ramps often are not parallel to the walking surface or the surface of the treads or ramps. Consequently, the walking surface, stair or ramp may need protection in some locations but not in others. (See Figure A-9.8.8.1.) In some instances, grades are artificially raised close to walking surfaces, stairs or ramps to avoid installing guards. This provides little or no protection for the users. That is why the requirements specify differences in elevation not only immediately adjacent to the construction but also for a distance of 1 200 mm (48") from it by requiring that the slope of the ground be within certain limits. (See Figure A-9.8.8.1.)

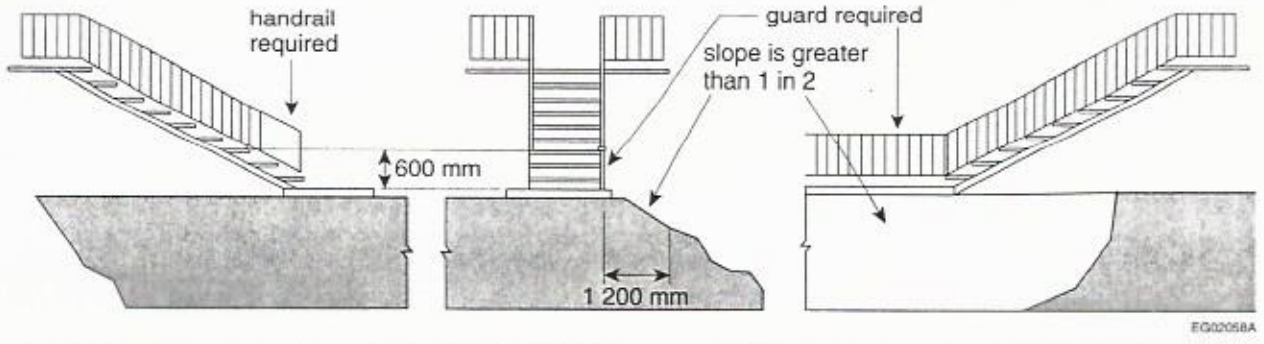

Figure A-9.8.8.1.
Required locations of guards

2) Except as provided in Sentences (3) and 3.3.2.9.(4) and Articles 3.3.4.7. and 3.3.5.10., openings through *guards* shall be of a size that prevents the passage of a spherical object whose diameter is more than 100 mm (3 7/8").

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3) Openings through *guards* other than those required by Sentence (1) that serve *occupancies* other than *industrial occupancies* shall be of a size that
a) prevents the passage of a spherical object whose diameter is 100 mm, or
b) permits the passage of a spherical object whose diameter is 200 mm.
(See Note A-9.8.8.5.(3).)

A-9.8.8.5.(3) Risk of Children Getting Their Head Stuck between Balusters. The requirements to prevent children falling through guards also serve to provide adequate protection against this problem. However, guards are often installed where they are not required by the Code; i.e., in places where the difference in elevation is less than 600 mm (24"). In these cases, there is no need to require the openings between balusters to be less than 100 mm (3 7/8"). However, there is a range of openings between 100 mm (3 7/8") and 200 mm (8") in which children can get their head stuck. Therefore, openings in this range are not permitted except in buildings of industrial occupancy, where children are unlikely to be present except under strict supervision.

4) Except for *guards* conforming to Article 3.3.5.10., *guards* that protect a level located more than one *storey* or 4.2 m above the adjacent level shall be designed so that no member, attachment or opening located between 140 mm and 900 mm above the level protected by the *guard* facilitates climbing. (See Note A-9.8.8.6.(1).)

A-9.8.8.6.(1) Configuration of Members, Attachments or Openings in Guards so as to not Facilitate Climbing. Some configurations of members, attachments or openings may be part of a guard design and still comply with Sentence 9.8.8.6.(1). Figures A-9.8.8.6.(1)-A to A-9.8.8.6.(1)-D present a few examples of designs that are considered to not facilitate climbing.
Protrusions that are greater than 450 mm (18") apart horizontally and vertically are considered sufficiently far apart to reduce the likelihood that young children will be able to get a handhold or toehold on the protrusions and climb the guard.

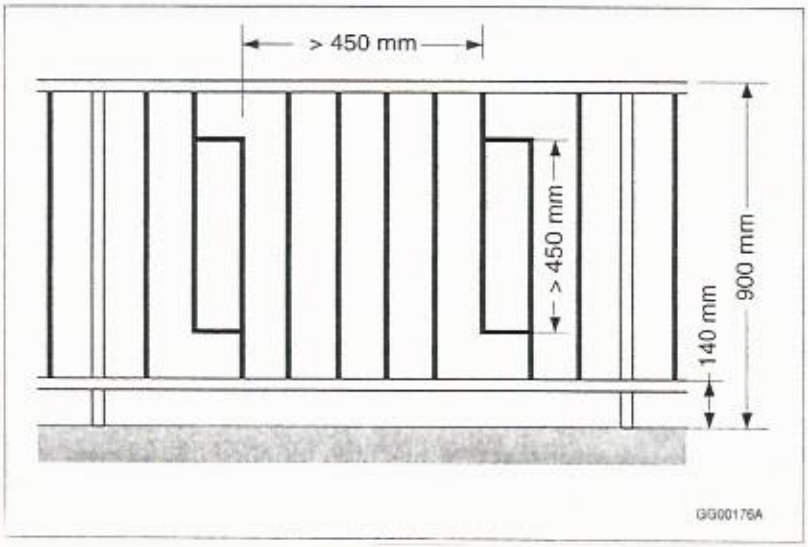

Figure A-9.8.8.6.(1)-A
Example of minimum horizontal and vertical clearances between protrusions in guards

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5) Sentence (1) does not apply
a) to the front edges of *stages*,
b) to loading docks, or
c) where access is provided for maintenance purposes only.

3.3.1.19. Transparent Doors and Panels
1) Except as permitted by Sentence (5), a glass or transparent door shall be designed and constructed so that the existence and position of the door is readily apparent, by attaching visually contrasting hardware, bars or other permanent fixtures to it.

2) The visibility of fully glazed transparent doors, sidelights and panels shall be enhanced through the inclusion of mullions, markings or other elements that
a) are visually contrasting,
b) are at least 50 mm (2") high,
c) extend the full width of the door, sidelight or panel, and
d) are located between 1 350 mm (53") and 1 500 mm (60") above the floor.

3) A glass door shall be constructed of
a) laminated or tempered safety glass conforming to CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass," or
b) wired glass conforming to CAN/CGSB-12.11-M, "Wired Safety Glass."

4) Except as permitted by Sentence (5), transparent panels used in an *access to exit* that, because of their physical configuration or design, could be mistaken as a *means of egress* shall be made inaccessible by barriers or railings.

5) Sliding glass *partitions* that separate a *public corridor* from an adjacent *occupancy* and that are open during normal working hours need not conform to Sentences (1) and (4), provided the *partitions* are suitably marked in conformance with Sentence (2) to indicate their existence and position.

6) Where vision glass is provided in doors or transparent sidelights, the lowest edge of the glass shall be no higher than 900 mm (36") above floor level.

7) Glass in doors and in sidelights that could be mistaken for doors, within or at the entrances to *dwelling units* and in public areas, shall conform to the requirements of Article 9.6.1.4.

8) A window in a public area that extends to less than 1 000 mm (39") above the floor and is located above the second *storey* in a *building* of *residential occupancy*, shall be protected by a barrier or railing to not less than 1 070 mm (42") above the floor, or the window shall be non-openable and designed to withstand the lateral design loads for balcony *guards* required by Article 4.1.5.14.

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Article 4.1.5.14. Loads on Guards and Handrails

(See Note A-4.1.5.14. and 4.1.5.15.(1).)

A-4.1.5.14. and 4.1.5.15.(1) Design of Guards. In the design of guards, due consideration should be given to the durability of the members and their connections.

1) The minimum specified horizontal load applied outward at the minimum required height of every required *guard* shall be

a) 3.0 kN/m for open viewing stands without fixed seats and for *means of egress* in grandstands, stadia, bleachers and arenas,

b) a concentrated load of 1.0 kN applied at any point, so as to produce the most critical effect, for access ways to equipment platforms, contiguous stairs and similar areas where the gathering of many people is improbable, and

c) 0.75 kN/m or a concentrated load of 1.0 kN applied at any point so as to produce the most critical effect, whichever governs for locations other than those described in Clauses (a) and (b).

2) The minimum specified horizontal load applied inward at the minimum required height of every required *guard* shall be half that specified in Sentence (1).

3) Individual elements within the *guard*, including solid panels and pickets, shall be designed for a load of 0.5 kN applied outward over an area of 100 mm (3 7/8") by 100 mm (3 7/8") located at any point in the element or elements so as to produce the most critical effect.

4) The size of the opening between any two adjacent vertical elements within a *guard* shall not exceed the limits required by Part 3 when each of these elements is subjected to a specified *live load* of 0.1 kN applied in opposite directions in the in-plane direction of the *guard* so as to produce the most critical effect.

5) The loads required in Sentence (3) need not be considered to act simultaneously with the loads provided for in Sentences (1), (2) and (6).

6) The minimum specified load applied vertically at the top of every required *guard* shall be 1.5 kN/m and need not be considered to act simultaneously with the horizontal load provided for in Sentence (1).

7) Handrails and their supports shall be designed and constructed to withstand the following loads, which need not be considered to act simultaneously:

a) a concentrated load not less than 0.9 kN applied at any point and in any direction for all handrails, and

b) a uniform load not less than 0.7 kN/m applied in any direction to handrails not located within *dwelling units*.

Article 3.3.1.23. Obstructions

1) No obstruction shall be permitted in any *occupancy* that would restrict the width of a normal *means of egress* from any part of a *floor area* to less than 750 mm unless an alternative *means of egress* is provided adjacent to, accessible from, and plainly visible from the obstructed *means of egress*. (See Note A-3.3.1.23.(1).)

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A-3.3.1.23.(1) Obstructions in Means of Egress. Obstructions including posts, counters or turnstiles should not be located in a manner that would restrict the width of a normal means of egress from a floor area or part of a floor area unless an alternative means of egress is provided adjacent to and plainly visible from the restricted means of egress.

Article 3.3.2.15. Risers for Stairs

1) In a Group A, Division 2 *occupancy* used for the serving of food and beverages, an interior *flight* of stairs with fewer than 3 risers is permitted provided it
a) is not less than 900 mm (36") wide,
b) is illuminated at all times that occupants are on the premises, and
c) has a handrail on each side.

Article 3.3.4.7. Stairs, Ramps, Landings, Handrails and *Guards* for *Dwelling Units*

1) Except as required in Article 3.3.4.8., stairs, ramps, landings, handrails and *guards* within a *dwelling unit* shall conform to the appropriate requirements in Section 9.8.

2) Exterior stairs, ramps, landings, handrails and *guards* serving a single *dwelling unit*, and loads on *guards* serving not more than two *dwelling units*, shall conform to the appropriate requirements in Section 9.8.

Article 3.3.4.8. Protection of Openable Windows

1) Except as provided in Sentence (2), openable windows in *suites* of *residential occupancy* shall be protected by
a) a *guard* with a minimum height of 1 070 mm (42") constructed in accordance with Article 3.3.1.18., or
b) a mechanism capable of controlling the free swinging or sliding of the openable part of the window so as to limit any clear unobstructed opening to not more than 100 mm (3 7/8") measured either vertically or horizontally where the other dimension is greater than 380 mm (15").

2) Windows need not be protected in accordance with Sentence (1) where
a) the only opening having greater dimensions than those allowed by Clause (1)(b) is located higher than 1 070 mm (42") above the finished floor, or
b) the bottom edge of the openable portion of the window is located less than 1 800 mm (6') above the floor or ground on the other side of the window.

Article 3.4.1.1. Scope

1) *Exit* facilities complying with this Section shall be provided from every *floor area* that is intended for *occupancy*. (See Note A-3.4.1.1.(1).)

A-3.4.1.1.(1) Type of *Exit* Facility. The requirements for exits in Section 3.4. were developed for new construction. If alterations are made to an existing building or changes of occupancy occur, other design solutions than those in Section 3.4. may have to be developed to maintain an acceptable level of safety if it is not practicable to fully conform to the requirements of this Section. In some cases the use of fire escapes to supplement the existing exit facilities may be the only practicable solution. Because of the variety of conditions that may be encountered in existing buildings, it is difficult to standardize or codify such requirements.

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Alternative means of providing acceptable levels of safety may have to be tailored to the particular building design. In all cases, however, the requirements described in Section 3.4. are intended to provide the level of safety to be achieved. If alternative measures are used, they should develop the level of safety implied in these requirements.

Article 3.4.1.2. Separation of Exits
1) Except as permitted by Sentence (2), if more than one *exit* is required from a *floor area*, each *exit* shall be separate from every other *exit* leading from that *floor area*.

2) If more than 2 *exits* are provided from a *floor area*, *exits* are permitted to converge in conformance with Sentence 3.4.3.1.(2), provided the cumulative capacity of the converging *exits* does not contribute more than 50% of the total required *exit* width for the *floor area*.

Article 3.4.1.3. Access to Exits
1) *Access to exits* shall conform to Section 3.3.

Article 3.4.1.4. Types of Exit
1) Subject to the requirements of this Section, an *exit* from any *floor area* shall be one of the following, used singly or in combination:
a) an exterior doorway,
b) an exterior passageway,
c) an exterior ramp,
d) an exterior stairway,
e) a fire escape (conforming to Subsection 3.4.7.),
f) a *horizontal exit*,
g) an interior passageway,
h) an interior ramp, or
i) an interior stairway.

Article 3.4.1.5. Exterior Exit Passageways
1) Access to an exterior *exit* passageway from a *floor area* shall be through *exit* doors at the floor level.

Article 3.4.1.6. Restricted Use of Horizontal Exits
1) Except as permitted by Sentence (2), *horizontal exits* shall not comprise more than one half of the required number of *exits* from any *floor area*.

2) In a hospital or nursing home with *treatment*, *horizontal exits* serving patients' sleeping rooms shall comprise not more than two thirds of the required number of *exits* from any *floor area*. (See Note A-3.4.1.6.(2).)

A-3.4.1.6.(2) Sleeping Area. Areas serving patients' sleeping rooms include sleeping areas and areas where patients are taken for treatment.

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Article 3.4.1.7. Slide Escapes
1) A slide escape shall not be erected on any *building* as a required *exit*, but is permitted to be provided as an additional egress facility if unusual hazards are foreseen.

Article 3.4.1.8. Transparent Doors and Panels
1) Glass and transparent panels in an *exit* shall conform to the appropriate requirements of Article 3.3.1.19. for glass and transparent panels in an *access to exit*.

Article 3.4.1.9. Mirrors near Exits
1) No mirror shall be placed in or adjacent to any *exit* in a manner that would confuse the direction of *exit*.

Article 3.4.1.10. Combustible Glazing in Exits
1) *Combustible* glazing is not permitted in wall or ceiling assemblies or in *closures* used to construct an *exit* enclosure.

3.4.3. Width and Height of Exits

Article 3.4.3.1. Exit Width Based on Occupant Load
1) For the purpose of determining the aggregate width of *exits*, the *occupant load* of every room or *floor area* shall be determined in conformance with Subsection 3.1.17.

2) Except as permitted by Sentence 3.4.3.2.(4), the required *exit* width shall be cumulative if 2 or more *exits* converge.

Article 3.4.3.2. Exit Width
1) Except as permitted by Sentence (3), the minimum aggregate required width of *exits* serving *floor areas* intended for *assembly occupancies*, *residential occupancies*, *business and personal services occupancies*, *mercantile occupancies*, and *industrial occupancies* shall be determined by multiplying the *occupant load* of the area served by
a) 6.1 mm (1/4") per person for ramps with a slope of not more than 1 in 8, doorways, corridors and passageways,
b) 8 mm (5/16") per person for a stair consisting of steps whose rise is not more than 180 mm and whose *run* is not less than 280 mm (11"), or
c) 9.2 mm (3/8") per person for
    i) ramps with a slope of more than 1 in 8, or
    ii) stairs, other than stairs conforming to Clause (b).

2) The minimum aggregate width of *exits* serving *floor areas* intended for a *care*, *treatment* or *detention occupancy* shall be determined by multiplying the *occupant load* of the area served by 18.4 mm (3/4") per person.

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3) The minimum aggregate width of *means of egress* serving a Group A, Division 4 *occupancy* shall be determined by multiplying the *occupant load* of the area served by
a) 1.8 mm (1/16") per person for
    i) aisles,
    ii) stairs other than *exit* stairs, and
    iii) ramps and passageways in vomitories and *exits*, and
b) 2.4 mm (1/8") per person for *exit* stairs.

4) Except as required by Sentences 3.4.3.2.(5) and (6), the required *exit* width need not be cumulative in an *exit* serving 2 or more *floor areas* located one above the other.

5) The required *exit* width for an *exit* stair in an assembly hall or *theatre* serving more than one balcony level shall conform to Sentence (6).

6) The required *exit* width for *exit* stairs that serve *interconnected floor space* designed in accordance with Articles 3.2.8.3. to 3.2.8.8. shall be cumulative, unless
a) the stairs provide not less than 0.3 m2 (3.3 ft²) of area of treads and landings for each occupant of the *interconnected floor space* (see Note A-3.4.3.2.(6)), or

A-3.4.3.2.(6) Evacuation of *Interconnected Floor Space*. This Sentence ensures that egress facilities allow for the simultaneous evacuation of all portions of an interconnected floor space. It does not contemplate the phased evacuation of occupants; thus in buildings where that type of evacuation is intended, fire protection requirements in addition to those prescribed in the Code may be necessary.
In the first instance, this Sentence provides for cumulative exiting that can accommodate the efficient movement of all occupants in the exit stairs. Clause 3.4.3.2.(6)(a) permits an alternative approach that will accommodate all the occupants in the stairs but will restrict the egress flow rate. Clause 3.4.3.2.(6)(b) provides a second alternative that assumes the occupants must queue before entering the stair. A "protected floor space" conforming to Article 3.2.8.6. is intended to provide an intermediate area of safety that is protected from the hazards of the interconnected floor space. It does not provide a holding or refuge area for all occupants of a floor area for an extended period of time.
To ensure that evacuation is not unduly delayed and that queuing of the occupants in the protected floor space can be accommodated, requires careful consideration in the design of the interface between the interconnected floor space/protected floor space/exit.
It is not appropriate, for example, to share a common vestibule in complying with Sentences 3.2.8.5.(1) and 3.2.8.6.(1). Under evacuation conditions, occupants entering the vestibule would flow towards the exit, as opposed to the protected floor space, thus resulting in queuing outside the vestibule and potential exposure to fire. To comply with the intent, it is necessary to design the egress path such that the occupants enter the protected floor space through a vestibule, then in turn enter the exit stair from the protected floor space. In addition, sufficient space should be provided between the vestibule and the exit to allow for the queuing of occupants in the protected floor space.

b) *protected floor spaces* conforming to Article 3.2.8.5. are provided at each floor level and the *protected floor space* on a floor level has not less than 0.5 m2 (5.4 ft²) of space for each occupant of that floor level of the *interconnected floor space*.
(See Note A-3.4.3.2.(6)(a).)

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A-3.4.3.2.(6)(a) Temporary Safety Area. The objective of Clause 3.4.3.2.(6)(a) is to provide an area of temporary safety in the *exit* stair shafts for the *occupants* of the *interconnected floor space*. This requirement is considered to be met if 0.3 m2 (3.3 ft²) per person is provided in the stair shaft between the floor level served and the floor level immediately beneath it.

7) If more than one *exit* is required, every *exit* shall be considered as contributing not more than one half of the required *exit* width.

8) The minimum widths of *exits* shall conform to Tables 3.4.3.2.-Aand 3.4.3.2.-B.

Table 3.4.3.2.-A
Minimum Widths of Exit Corridors, Passageways, Ramps, Stairs and Doorways in Group A, Group B, Division 1, and Groups C, D, E and F Occupancies
Forming Part of Sentence 3.4.3.2.(8)

Occupancy Classification	*Exit* Corridors and Passageways, mm	Ramps, mm	Stairs, mm	Doorways, mm
Group A, Group B, Division 1, Group C, Group D, Group E, Group F	1 100	1 100	900(1) 1 100(2)	800

Notes to Table 3.4.3.2.-A:
(1) Serving not more than 2 *storeys* above the lowest *exit level* or not more than 1 *storey* below the lowest *exit level*.
(2) Serving more than 2 *storeys* above the lowest *exit level* or more than 1 *storey* below the lowest *exit level*.

Table 3.4.3.2.-B
Minimum Widths of Exit Corridors, Passageways, Ramps, Stairs and Doorways in Group B, Division 2 and Division 3 Occupancies
Forming Part of Sentence 3.4.3.2.(8)

Occupancy Classification	*Exit* Corridors and Passage-ways, mm	Ramps, mm		Stairs, mm		Doorways, mm	
		Not serving patients' or residents' sleeping rooms(1)	Serving patients' or residents' sleeping rooms(1)	Not serving patients' or residents' sleeping rooms(1)	Serving patients' or residents' sleeping rooms(1)	Not serving patients' or residents' sleeping rooms(1)	Serving patients' or residents' sleeping rooms(1)
Group B, Division 2	1 100	1 100	1 650	900(2) 1 100(3)	1 650	850	1 050
Group B, Division 3							
with more than 10 residents	1 100	1 100	1 100	900(2) 1 100(3)	1 100(2) 1 650(3)	850	850
with not more than 10 residents	1 100	1 100	1 100	900(2) 1 100(3)	900(2) 1 100(3)	850	850

Notes to Table 3.4.3.2.-B:
(1) Minimum widths of ramps, stairs and doorways do not apply within individual *suites* of *care occupancy*.
(2) Serving not more than 2 *storeys* above the lowest *exit level* or not more than 1 *storey* below the lowest *exit level*.
(3) Serving more than 2 *storeys* above the lowest *exit level* or more than 1 *storey* below the lowest *exit level*.

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Article 3.4.3.3. Exit Width Reduction

1) Except as permitted by Sentences (2) and (4), no fixture, turnstile or construction shall project into or be fixed within the required width of an *exit*.

2) Swinging doors in their swing shall not reduce the required width of *exit* stairs or landings to less than 750 mm (29 ½") or reduce the width of an *exit* passageway to less than the minimum required width.

3) Doors shall be installed so that, when open, they do not diminish nor obstruct the required width of the *exit*.

4) Handrails and construction below handrails, including handrail supports and stair stringers, shall not project more than 100 mm (3 7/8") into the required width of a *means of egress*.

Article 3.4.3.4. Headroom Clearance

(See Note A-3.4.3.4.)

A-3.4.3.4. Clear Height and Width. Clear height is intended to be measured from a line tangent to the nosings extended to the underside of the lowest element above the walking surface, over the clear width of the exit (see Figure A-3.4.3.4.). Examples of low elements above the walking surface include light fixtures or sprinkler heads and piping.

Clear width is intended to be measured from a line tangent to horizontal protrusions such as handrails.

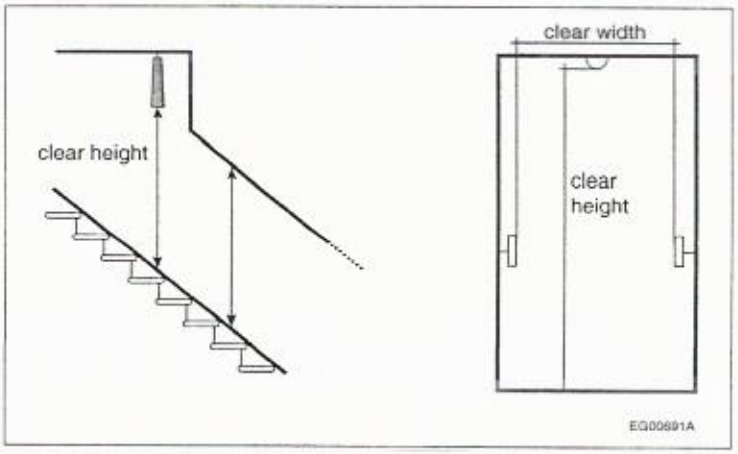

Figure A-3.4.3.4.
Measuring clear height

1) Except as permitted by Sentences (4) and (5), every *exit* shall have a clear height over the clear width of the *exit* of not less than 2 050 mm (6'-9").

2) The clear height of stairways shall be measured vertically over the clear width of the stairway, from the straight line tangent to the tread and landing nosings to the lowest element above. (See Note A-9.8.7.4.)

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A-9.8.7.4. Height of Handrails. Figure A-9.8.7.4. illustrates how to measure handrail height.

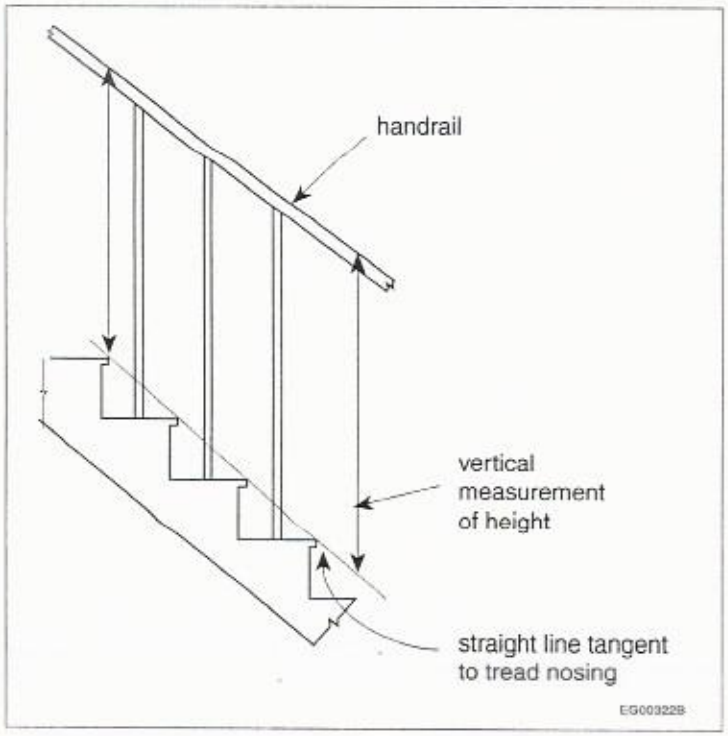

Figure A-9.8.7.4.
Measuring handrail height

3) The clear height of landings shall be measured within the clear width of the landing vertically to the lowest element above.

4) Except as permitted by Sentence (5), the headroom clearance for doorways shall be not less than 2 030 mm (6'-8").

5) No door closer or other device shall be installed so as to reduce the headroom clearance of a doorway to less than 1 980 mm (6'-6").

3.4.4. Fire Separation of Exits

Article 3.4.4.1. Fire-Resistance Rating of Exit Separations

1) Except as permitted by Sentences (2), 3.3.5.4.(3), 3.4.4.2.(2) and 3.4.4.3.(1), every *exit* shall be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* not less than that required by Subsection 3.2.2., but not less than 45 min, for

a) the floor assembly above the *storey*, or

b) the floor assembly below the *storey*, if there is no floor assembly above.

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2) The *fire-resistance rating* of the *fire separation* referred to in Sentence (1) need not be more than 2 h.

3) If an *exit* stair in an assembly hall or *theatre* serves more than one balcony level, the *exit* stair shall be separated from the remainder of the *building* in conformance with Sentence (1).

Article 3.4.4.2. Exits through Lobbies

1) Except as permitted by Sentence (2), no *exit* from a *floor area* above or below the *first storey* shall lead through a lobby.

2) Not more than one *exit* from a *floor area* is permitted to lead through a lobby, provided
a) the lobby floor is not more than 4.5 m (14'-9") above *grade*,
b) the path of travel through the lobby to the outdoors is not more than 15 m (15'),
c) the adjacent rooms or premises having direct access to the lobby do not contain a *care*, *residential* or *industrial occupancy*,
d) the lobby is not located within an *interconnected floor space* other than as described in Sentence 3.2.8.2.(6),
e) the lobby conforms to the requirements for *exits*, except that
   i) rooms other than *service rooms* and storage rooms are permitted to open onto the lobby,
   ii) the *fire separation* between the lobby and a room used for the sole purpose of control and supervision of the *building* need not have a *fire-resistance rating*,
   iii) the *fire separation* between the lobby and adjacent *occupancies* that are permitted to open onto the lobby need not have a *fire-resistance rating* provided the lobby and adjacent *occupancies* are *sprinklered*, and
   iv) passenger elevators are permitted to open onto the lobby, provided the elevator doors are designed to remain closed except while loading and unloading passengers, and
(see Note A-3.4.4.2.(2)(e))

A-3.4.4.2.(2)(e) Requirements for Lobby. If an *exit* is permitted to lead through a lobby, the lobby must provide a level of protection approaching that of the *exit*. As well as meeting the width and height requirements for *exits*, the lobby must be separated from the remainder of the *building* by a *fire separation* having a *fire-resistance rating* at least equal to that required for the *exit*, unless one of the exceptions in this Clause is applied.

f) a *fire separation*, constructed in accordance with Sentence 3.4.4.1.(1), is maintained between the lobby and any *exit* permitted by this Sentence to lead through the lobby.

Article 3.4.4.3. Exterior Passageway Exceptions

1) The requirements of Sentences 3.4.4.1.(1) and 3.2.3.13.(1) and (3) do not apply to an exterior *exit* passageway provided
a) not less than 50% of the exterior side is open to the outdoors, and
b) an *exit* stair is provided at each end of the passageway.

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Article 3.4.4.4. Integrity of Exits

1) A *fire separation* that separates an *exit* from the remainder of the *building* shall have no openings except for
a) standpipe and sprinkler piping,
b) electrical wires and cables, totally enclosed *noncombustible* raceways and *noncombustible* piping that serve only the *exit*,
c) openings required by the provisions of Subsection 3.2.6.,
d) *exit* doorways, and
e) wired glass and glass block permitted by Article 3.1.8.16.

2) *Exits* within scissors stairs and other contiguous *exit* stairways shall be separated from each other by a smoke-tight *fire separation* having a *fire-resistance rating* not less than that required for the floor assembly through which they pass.

3) *Fire separations* separating contiguous stairs described in Sentence (2) shall not be pierced by doorways, ductwork, piping or any other openings that affect the continuity of the separation.

4) A fuel-fired *appliance* shall not be installed in an *exit*.

5) An *exit* shall not be used as a *plenum* for a heating, ventilating or air-conditioning system.

6) An *exit* shall be designed for no purpose other than for exiting, except that an *exit* is permitted also to be designed to serve as an access to a *floor area*.

7) A *service room* shall not open directly into an *exit*.

8) Storage rooms, washrooms, toilet rooms, laundry rooms and similar ancillary rooms shall not open directly into an *exit*.

9) *Service spaces* referred to in Sentence 3.2.1.1.(8) shall not open directly into an *exit*.

3.4.5. Exit Signs

Article 3.4.5.1. Exit Signs

1) Every *exit* door shall have an *exit* sign placed over or adjacent to it if the *exit* serves
a) a *building* more than 2 *storeys* in *building height*,
b) a *building* having an *occupant load* of more than 150, or
c) a room or *floor area* that has a fire escape as part of a required *means of egress*.

2) Every *exit* sign shall
a) be visible on approach to the *exit*,
b) consist of a green and white or lightly tinted graphical symbol meeting the colour specifications referred to in ISO 3864-1, "Graphical symbols – Safety colours and safety signs – Part 1: Design principles for safety signs and safety markings," and

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c) conform to ISO 7010, "Graphical symbols – Safety colours and safety signs – Registered safety signs," for the following symbols (see Note A-3.4.5.1.(2)(c)):

i) E001 emergency exit left,
ii) E002 emergency exit right,
iii) E005 90-degree directional arrow, and
iv) E006 45-degree directional arrow.

A-3.4.5.1.(2)(c) Graphical Symbols for Exit Signs. ISO 7010, "Graphical symbols – Safety colours and safety signs – Registered safety signs," identifies the following internationally recognized symbols for use at required exits.

Figure A-3.4.5.1.(2)(c)-A
"Emergency exit left" (E001) symbol from ISO 7010

Figure A-3.4.5.1.(2)(c)-B
90-degree directional arrow (E005) from ISO 7010

3) Internally illuminated *exit* signs shall be continuously illuminated and
a) where illumination of the sign is powered by an electrical circuit, be constructed in conformance with CSA C22.2 No. 141, "Emergency Lighting Equipment," or
b) where illumination of the sign is not powered by an electrical circuit, be constructed in conformance with CAN/ULC-S572, "Photoluminescent and Self-Luminous Exit Signs and Path Marking Systems."

4) Externally illuminated *exit* signs shall be continuously illuminated and be constructed in conformance with CAN/ULC-S572, "Photoluminescent and Self-Luminous Exit Signs and Path Marking Systems." (See Note A-3.4.5.1.(4).)

A-3.4.5.1.(4) Externally Illuminated Signs. An external lighting source is required to properly charge photoluminescent signs. These types of signs must be lit in conformance with the charging requirements indicated on the exit signs in accordance with CAN/ULC-S572, "Photoluminescent and Self-Luminous Exit Signs and Path Marking Systems."

5) The circuitry serving lighting for externally and internally illuminated *exit* signs shall
a) serve no equipment other than emergency equipment, and
b) be connected to an emergency power supply as described in Article 3.2.7.4.

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Article 3.2.7.4. Emergency Power for Lighting

1) An emergency power supply shall be

a) provided to maintain the emergency lighting required by this Subsection from a power source such as batteries or generators that will continue to supply power in the event that the regular power supply to the *building* is interrupted, and

b) so designed and installed that upon failure of the regular power it will assume the electrical load automatically for a period of

i) 2 h for a *building* within the scope of Subsection 3.2.6.,

ii) 1 h for a *building* of Group B *major occupancy* classification that is not within the scope of Subsection 3.2.6.,

iii) 1 h for a *building* constructed in accordance with Article 3.2.2.50. or 3.2.2.58., and

iv) 30 min for a *building* of any other *occupancy*.

(See Note A-3.2.7.4.(1).)

A-3.2.7.4.(1) Emergency Power Reliability. In some areas power outages are frequent and may be of long duration. These local conditions should be taken into account in determining the type of system for supplying emergency power for lighting. This should be studied at the planning stage of a building project in conjunction with the local fire safety and building officials.

2) If self-contained emergency lighting units are used, they shall conform to CSA C22.2 No. 141, "Emergency Lighting Equipment."

6) Where no *exit* is visible from a *public corridor*, from a corridor used by the public in a Group A or B *major occupancy*, or from principal routes serving an open *floor area* having an *occupant load* of more than 150, an *exit* sign conforming to Clauses (2)(b) and (c) with an arrow or pointer indicating the direction of egress shall be provided.

7) Except for egress doorways described in Sentence 3.3.2.4.(4), an *exit* sign conforming to Sentences (2) to (5) shall be placed over or adjacent to every egress doorway from rooms with an *occupant load* of more than 60 in Group A, Division 1 *occupancies*, dance halls, licensed beverage establishments, and other similar *occupancies* that, when occupied, have lighting levels below that which would provide easy identification of the egress doorway.

Article 3.4.5.2. Signs for Stairs and Ramps at Exit Level

1) In a *building* more than 2 *storeys* in *building height*, any part of an *exit* ramp or stairway that continues up or down past the lowest *exit level* shall have a posted sign clearly indicating that it does not lead to an *exit*.

3.4.6. Types of Exit Facilities

(See Note A-3.4.6.)

A-3.4.6. Application to Means of Egress. The requirements in Subsection 3.4.6. apply to interior and exterior *exits*, as well as to ramps, stairways and passageways used by the public as *access to exit*. The treads, risers, landings, handrails and *guards* for the latter *access to exit* facilities must thus be provided in conformance with the appropriate requirements for *exit* facilities.

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Article 3.4.6.1. Slip Resistance of Ramps and Stairs
1) The surfaces of ramps, and landings and treads
a) shall have a finish that is slip resistant, and
b) if accessible to the public, shall have either a colour contrast or a distinctive pattern to demarcate the leading edge of the tread and the leading edge of the landing, as well as the beginning and end of a ramp.

2) Treads and landings of exterior *exit* stairs more than 10 m (33') high shall be designed to be free of ice and snow accumulations.

Article 3.4.6.2. Minimum Number of Risers
1) Except as permitted by Sentence 3.3.2.15.(1), every *flight* of interior stairs shall have not less than 3 risers.

Article 3.4.6.3. Maximum Vertical Rise of Stair Flights and Required Landings
1) No *flight* of stairs shall have a vertical rise of more than 3.7 m (12') between floors or landings, except that a *flight* of stairs serving as an *exit* in a Group B, Division 2 *occupancy* shall have a vertical rise not more than 2.4 m (8') between floors or landings.

2) Except as provided in Sentence (3), a landing shall be provided
a) at the top and bottom of each *flight* of interior and exterior stairs,
b) at the top and bottom of every section of ramp,
c) where a doorway opens onto a stair or ramp,
d) where a ramp opens onto a stair, and
e) where a stair opens onto a ramp.

3) A landing may be omitted at the bottom of an exterior stair or ramp, provided there is no gate, door or fixed obstruction within the lesser of
a) the width of the stair or ramp, or
b) 1 100 mm (44").

Article 3.4.6.4. Dimensions of Landings
(See Note A-3.4.6.4.)
A-3.4.6.4. Dimensions of Landings. A landing is a floor area provided at the top or bottom of a flight of stairs or a ramp, or a platform built as part of a stairway or ramp. Landings provide a safe surface for users to rest upon, allow design flexibility, and facilitate a change in direction.

Figure A-3.4.6.4. illustrates how to measure the length of a landing for various landing configurations turning less than 90°, including straight landings.

1) Except as provided in Sentence (2), a landing shall be at least as wide and as long as the width of the stairway in which it occurs.

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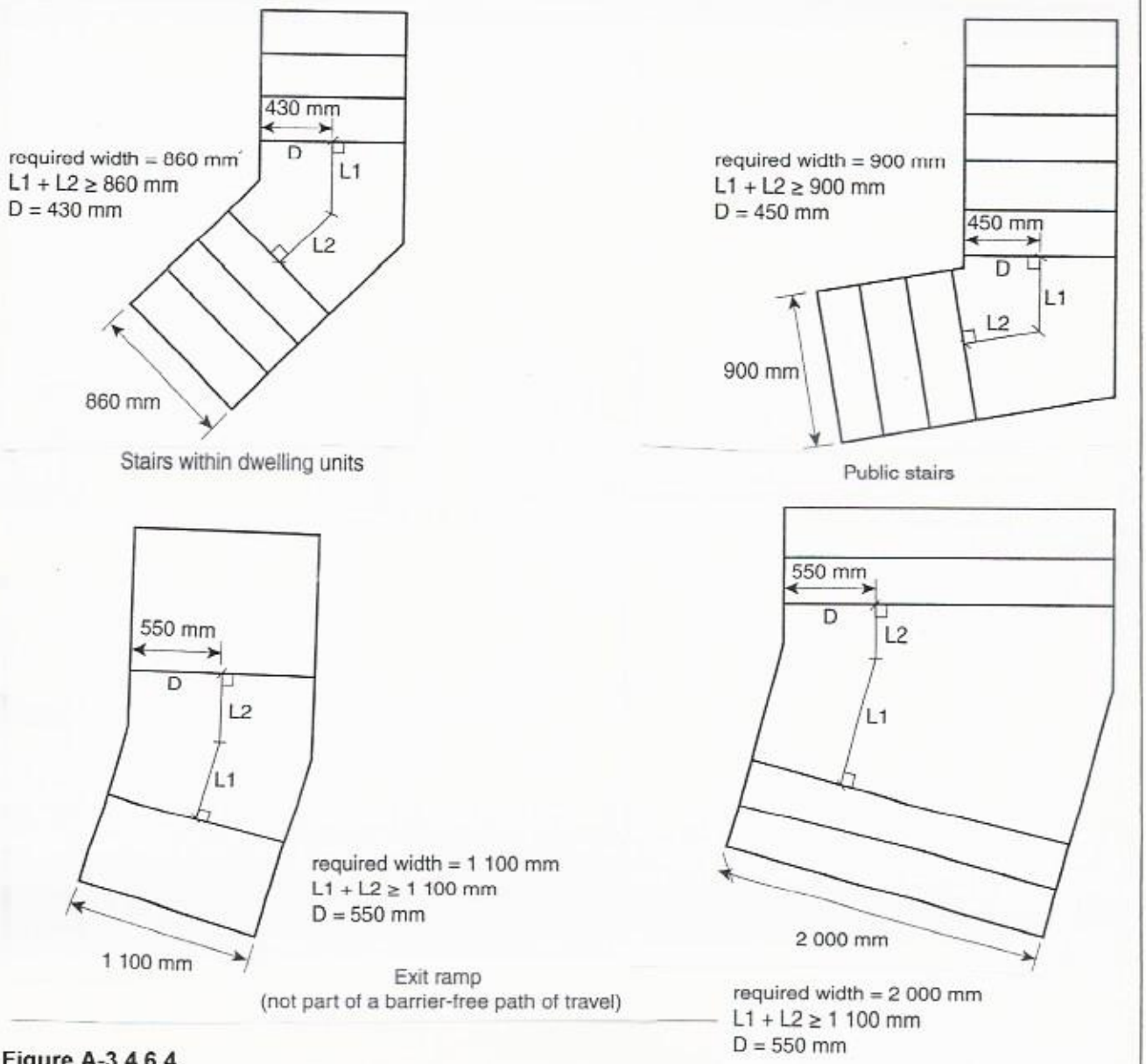

Figure A-3.4.6.4.
Landing configurations

Notes to Figure A-3.4.6.4.:

(1) L1 + L2 = length of the landing
= the lesser of the required width of the stair or ramp, or 1 100 mm
See Sentences 3.4.6.4.(2) and 9.8.6.3.(2).

(2) D = distance from the narrow edge where the length of the landing is measured
= half the required length of the landing
See Sentences 3.4.6.4.(3) and 9.8.6.3.(3).

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2) In a straight stairway and in a stairway that turns less than 90°, the length of the landing need not be more than the lesser of
a) the required width of stair, or
b) 1 100 mm (44").

3) The length of a landing shall be measured perpendicular to the nosing of adjacent steps, at a distance equal to half the length required in Sentence (2), from the narrow edge of the landing.

4) Where a doorway or stairway empties onto a ramp through a side wall, there shall be a level area extending across the full width of the ramp, and for a distance of 300 mm (12") on either side of the wall opening, except one side if it abuts on an end wall.

5) Where a doorway or stairway empties onto a ramp through an end wall, there shall be a level area extending across the full width of the ramp and along its length for not less than 900 mm (36").

Article 3.4.6.5. Handrails

1) One handrail shall be provided on stairs that are less than 1 100 mm in width.

2) One handrail shall be provided on each side of
a) stairs that are 1 100 mm (44") or more in width,
b) curved *flights* of any width, and
c) ramps.

3) In addition to Sentence (2), intermediate handrails shall be provided so that
a) a handrail is reachable within 750 mm (29.5") of all portions of the required *exit* width,
b) at least one portion of the stair or ramp between two handrails is the minimum width required for stairways or ramps (see Sentences 3.4.3.2.(8) and 3.4.3.3.(4)), and
c) all other portions of the stair or ramp between two handrails have a clear width of 510 mm (20") or more.

4) Where a stair or ramp is wider than its required *exit* width, handrails shall be located along the most direct path of travel. (See Note A-3.4.6.5.(4).)
A-3.4.6.5.(4) Wider Stairs than Required. The intent of Sentence 3.4.6.5.(4) is that handrails be installed in relation to the required exit width only, regardless of the actual width of the stair and ramp. The required handrails are provided along the assumed natural path of travel to and from the building.

5) Handrails shall be continuously graspable along their entire length, be free of any sharp or abrasive elements, and have
a) a circular cross-section with an outside diameter not less than 30 mm (1 1/4") and not more than 43 mm (1 11/16"), or
b) a non-circular cross-section with a perimeter not less than 100 mm (3 7/8") and not more than 125 mm (5") and whose largest cross-sectional dimension is not more than 45 mm (1 ¾").

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6) The height of handrails on stairs, on aisles with steps and on ramps shall be measured vertically from the top of the handrail to
a) a straight line drawn tangent to the tread nosings of the stair or aisle step served by the handrail (see Note A-9.8.7.4.), or
b) the surface of the ramp, floor or landing served by the handrail.

7) Except as provided in Sentence (8) and Clause 3.8.3.5.(1)(e), the height of handrails on stairs, on aisles with steps and on ramps shall be
a) not less than 865 mm (34"), and
b) not more than 1 070 mm (42").

8) Handrails installed in addition to required handrails need not comply with Sentence (7).

9) Required handrails shall be continuously graspable throughout the length of
a) a ramp, and
b) a *flight* of stairs, from the bottom riser to the top riser.
(See Note A-9.8.7.2.)

A-9.8.7.2. Continuity of Handrails. The guidance and support provided by handrails is particularly important at the beginning and end of ramps and flights of stairs and at changes in direction such as at landings and winders.

The intent of the requirement in Sentence (2) for handrails to be continuous throughout the length of the stair is that the handrail be continuous from the bottom riser to the top riser of the stair. (See Figure A-9.8.7.2.)

For stairs or ramps serving a single dwelling unit, the intent of the requirement for handrails to be continuous throughout the length of the flight is that the handrail be continuous from the bottom riser to the top riser of the flight. The required handrail may start back from the bottom riser only if it is supported by a newel post or volute installed on the bottom tread. (See Figure A-9.8.7.2.) With regard to stairs serving a single dwelling unit, the handrail may terminate at landings.

In the case of stairs within dwelling units that incorporate winders, the handrail should be configured so that it will in fact provide guidance and support to the stair user throughout the turn through the winder.

10) Except where interrupted by doorways, at least one handrail shall be continuous throughout the length of a stairway or ramp, including at landings. (See Note A-3.4.6.5.(10).)

A-3.4.6.5.(10) Continuity of Handrail. Blind or visually-impaired persons rely on handrails to guide them on stairways. A continuous handrail will assist them in negotiating stairs at changes in direction. The extended handrail is useful to persons with physical disabilities to steady themselves before using the stairs. Handrails should, however, return to the wall, floor or post, so as not to constitute a hazard to blind or visually-impaired persons.

11) Handrails shall be terminated in a manner that will not obstruct pedestrian travel or create a hazard. (See Note A-3.4.6.5.(10).)

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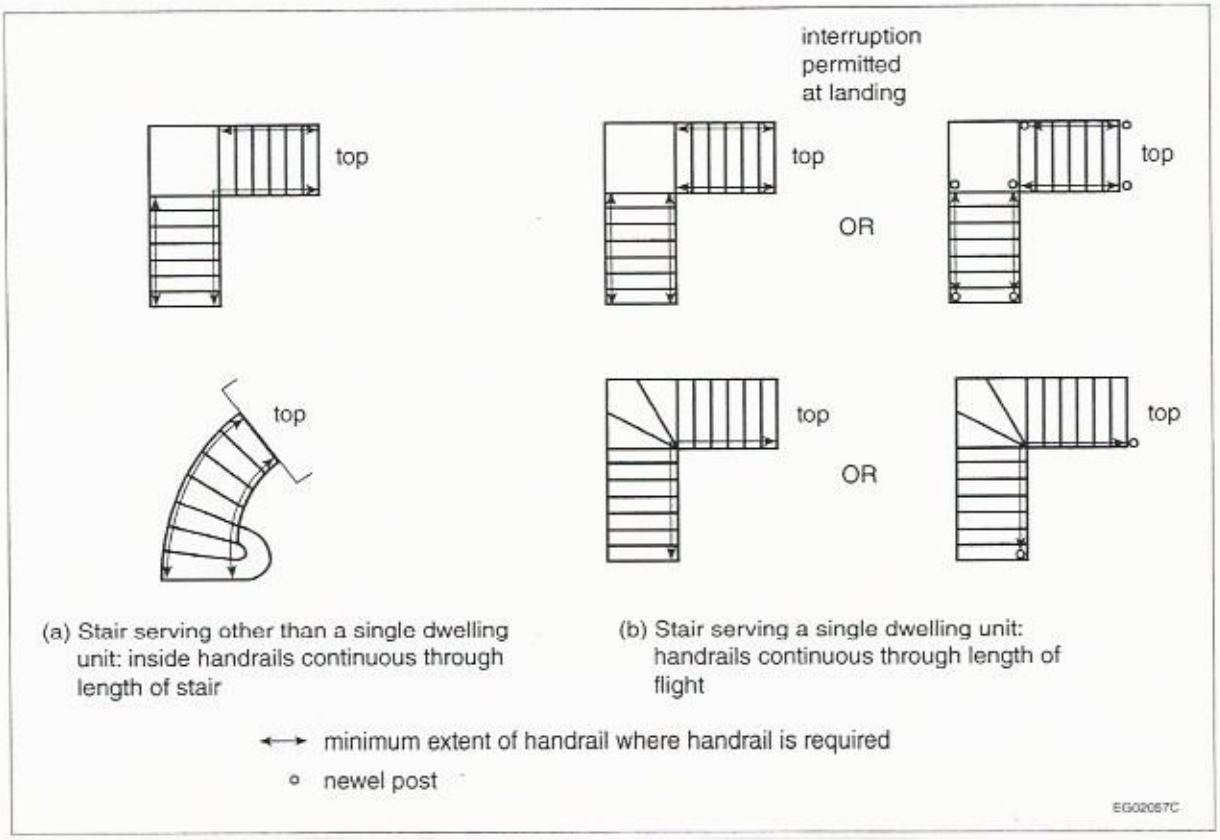

Figure A-9.8.7.2.
Continuity of handrails at the top and bottom of stairs and flights
Note to Figure A-9.8.7.2.:
(1) See Article 9.8.7.1. to determine the number of handrails required. Some stairs will require only one, while some will require two or more.

12) At least one handrail at the side of a stairway or ramp shall extend horizontally not less than 300 mm (12") beyond the top and bottom of the stairway or ramp. (See Note A-3.4.6.5.(10).)

13) The clearance between a handrail and any surface behind it shall be not less than
a) 50 mm (2"), or
b) 60 mm (2 3/8") if the surface behind the handrail is rough or abrasive.

14) Handrails and their supports shall be designed and constructed to withstand the loading values specified in Sentence 4.1.5.14.(7).

15) A ramp shall have handrails on both sides.

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Article 3.4.6.6. Guards
1) Every *exit* shall have a wall or a well-secured *guard* on each side, where
a) there is a difference in elevation of more than 600 mm (24") between the walking surface and the adjacent surface, or
b) the adjacent surface within 1.2 m (4') of the walking surface has a slope of more than 1 in 2. (See Note A-9.8.8.1.)

2) Except as required by Sentence (4), the height of *guards* for *exit* stairs and *exit* ramps as well as their landings shall be not less than 1 070 mm (42").

3) The height of *guards* shall be measured vertically to the top of the *guard* from
a) a line drawn through the outside edges of the stair nosings, or
b) the surface of the ramp or landing.

4) The height of *guards* for exterior stairs and landings more than 10 m (33') above adjacent ground level shall be not less than 1 500 mm (5') measured vertically to the top of the *guard* from the surface of the landing or from a line drawn through the outside edges of the stair nosings.

5) Except as provided in Sentence 3.3.1.18.(3) and Articles 3.3.4.7. and 3.3.5.10., *guards* in *exits* shall not have any openings that permit the passage of a spherical object whose diameter is more than 100 mm (3 7/8").

6) In a stairway, a window for which the distance measured vertically between the bottom of the window and a line drawn through the outside edges of the stair nosings is less than 900 mm (36"), or a window that extends to less than 1 070 mm (42") above the landing, shall
a) be protected by a *guard* that is
    i) located approximately 900 mm (36") above a line drawn through the outside edges of the stair nosings, or
    ii) not less than 1 070 mm (42") high measured to the top of the *guard* from the surface of the landing, or
b) be fixed in position and designed to resist the lateral design loads specified for *guards* and walls in Articles 4.1.5.14. and 4.1.5.16.

7) Except for *guards* conforming to Article 3.3.5.10., *guards* that protect a level located more than one *storey* or 4.2 m (13'-9") above the adjacent level shall be designed so that no member, attachment or opening located between 140 mm (5.5") and 900 mm (36") above the level being protected by the *guard* facilitates climbing. (See Note A-9.8.8.6.(1).)

Article 3.4.6.7. Ramp Slope
(See also Article 3.8.3.5.)

Article 3.8.3.5. Ramps
1) A ramp located in a *barrier-free* path of travel shall

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a) have a clear width not less than 870 mm (34 ¼") (see Note A-3.4.3.4.),
b) have a slope not more than 1 in 12 (see Note A-3.8.3.5.(1)(b)),

A-3.8.3.5.(1)(b) Ramp Slopes. Ramps with a slope of more than 1 in 16 can be very difficult for persons with physical disabilities with upper body mobility to manage. Even though they pose less of a problem for persons in motorized wheelchairs, these ramps can be unsafe to descend, especially in cold climates. Although Article 3.8.3.5. permits slopes on ramps as great as 1 in 12 for distances of up to 9 m (30'), slopes of 1 in 20 are safer and less strenuous. When limited space is available, as may be the case during renovations, ramps with a slope of up to 1 in 12 should be restricted to lengths not exceeding 3 m (10') whenever possible. A strip contrasting in colour and texture should be used at the top and bottom of ramps to warn persons with low or no vision

c) have a level area not less than 1 500 (5') by 1 500 mm (5') at the top and bottom and at intermediate levels of a ramp leading to a door, so that on the latch side the level area extends not less than

i) 600 mm (24") beyond the edge of the door opening where the door opens towards the ramp, or
ii) 300 mm (12") beyond the edge of the door opening where the door opens away from the ramp,
(see Note A-3.8.3.5.(1)(c)),

A-3.8.3.5.(1)(c) Landing Design at Doorways Leading to Ramps.

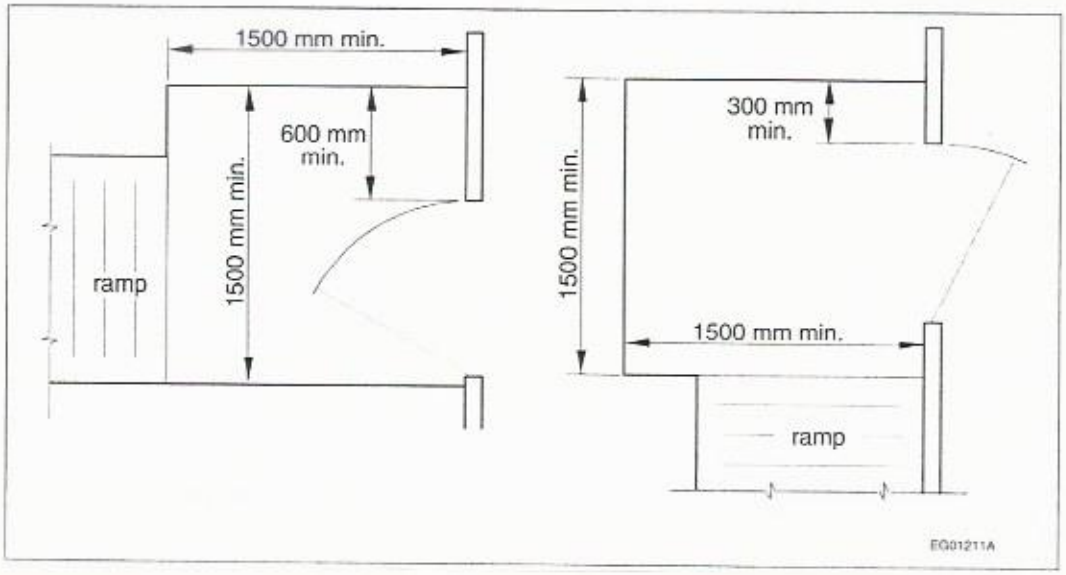

Figure A-3.8.3.5.(1)(c)
Landing design at doorways leading to ramps

d) have a level area not less than 1 200 mm (48") long and at least the same width as the ramp
i) at intervals not more than 9 m (30') along its length, and
ii) where there is an abrupt change in the direction of the ramp, and

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e) except as provided in Sentences (2) and (3), be equipped with handrails conforming to Article 3.4.6.5., except that they shall be not less than 865 mm (34") and not more than 965 mm (38") high, and
f) be equipped with *guards* conforming to Article 3.4.6.6.

2) Handrails installed in addition to required handrails need not comply with the height requirements stated in Clause (1)(e).

3) The requirement for handrails in Clause (1)(e) need not apply to a ramp serving as an aisle for fixed seating.

4) The surfaces of ramps and landings shall
a) be hard or resilient where the ramp is steeper than 1 in 15 (see Note A-3.8.3.5.(4)(a)),
A-3.8.3.5.(4)(a) Surface of Ramps. Sentence 3.8.3.2.(2) requires that all walking surfaces in a barrier-free path of travel be stable and firm to limit the effort required by persons using wheelchairs or other mobility aids. Therefore, Sentence 3.8.3.5.(4) requires that hard or resilient flooring be used on the surfaces of steeper ramps. Furthermore, carpet and like materials should not be installed on any ramp.

b) have a cross slope no steeper than 1 in 50, and
c) where exposed to water, be designed to drain.

5) Ramps and landings not at *grade* or adjacent to a wall shall have edge protection consisting of
a) a curb not less than 75 mm (3") high, or
b) a raised barrier or rail located not more than 100 mm (3 7/8") from the ramp or landing surface.

6) Floors or walks in a *barrier-free* path of travel having a slope steeper than 1 in 20 shall be designed as ramps.

1) Except as required for aisles by Article 3.3.2.5., the maximum slope of a ramp shall be
a) 1 in 10 in any *assembly*, *care*, *treatment*, *detention* or *residential occupancy*,
b) 1 in 6 in an *industrial occupancy*,
c) 1 in 8 in all other *occupancies*, and
d) 1 in 10 for an exterior ramp.

Article 3.4.6.8. Treads and Risers

(See Note A-9.8.4.)

A-9.8.4. Tread Configurations. The Code distinguishes four principal types of stair treads:
- rectangular treads, which are found in straight flights;
- tapered treads, which are found in curved flights;
- winders are described in Note A-9.8.4.6.; and
- spiral stairs, which are described in Note A-9.8.4.7.

See Figure A-9.8.4.-A.

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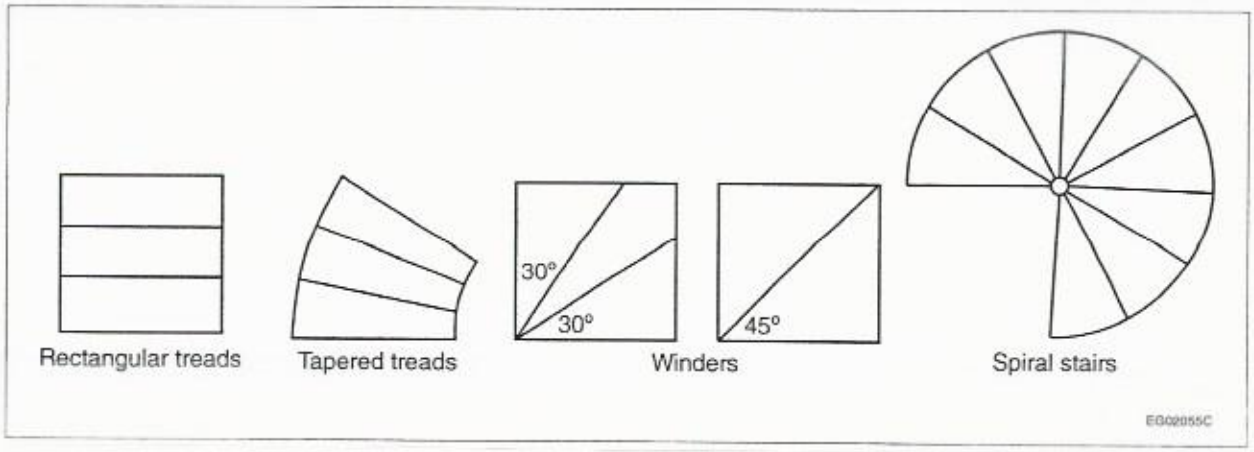

Figure A-9.8.4.-A
Types of treads

1) Except as permitted for *dwelling units* and by Sentence 3.4.7.5.(1) for fire escapes, steps for stairs shall have a *run* of not less than 280 mm (11") between successive steps.

2) Steps for stairs referred to in Sentence (1) shall have a rise between successive treads not less than 125 mm (5") and not more than 180 mm (7").

3) Except as provided in Article 3.3.4.7. and except for fire escape stairs, stairs that are principally used for maintenance and service, and stairs that serve *industrial occupancies* other than *storage garages*, steps for stairs shall have no open risers.

4) Except in fire escape stairs and where an exterior stair adjoins a *walkway* as permitted in Sentence 3.4.6.3.(3), risers, measured as the vertical nosing-to-nosing distance, shall be of uniform height in any one *flight*, with a maximum tolerance of
a) 5 mm (3/16") between adjacent treads or landings, and
b) 10 mm (3/8") between the tallest and shortest risers in a *flight*.

5) Except in fire escape stairs, treads shall have a uniform *run* with a maximum tolerance of
a) 5 mm (3/16") between adjacent treads, and
b) 10 mm (3/8") between the deepest and shallowest treads in a *flight*.

6) Treads and risers shall not differ significantly in *run* and rise in successive *flights* in any stair system.

7) The slope of treads or landings shall not exceed 1 in 50.

8) Except as permitted by Sentence (10), the top of the nosing of stair treads shall have a rounded or beveled edge extending not less than 6 mm (1/4") and not more than 13 mm (1/2") measured horizontally from the front of the nosing.

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9) The front edge of stair treads in *exits* and public *access to exits* shall be at right angles to the direction of *exit* travel.

10) If resilient material is used to cover the nosing of a stair tread, the minimum rounded or beveled edge required by Sentence (8) is permitted to be reduced to 3 mm (1/8").

Article 3.4.6.9. Curved Flights in Exits

1) *Exit* stair *flights* shall consist solely of
a) straight *flights*, or
b) curved *flights* complying with Sentence (2).

2) A curved *flight* used as an *exit* shall have
a) a handrail on each side,
b) a minimum *run* of 240 mm(9 ½"),
c) a *run* that conforms to Article 3.4.6.8. when measured at a point 300 mm (12") from the centre line of the handrail at the narrow end of the tread, and
d) an inside radius that is not less than twice the stair width.

3) *Tapered treads* shall have a consistent angle and uniform *run* and rise dimensions in accordance with the construction tolerances stipulated in Article 3.4.6.8. when measured at a point 300 mm (12") from the centre line of the handrail at the narrow end of the tread.

4) All *tapered treads* within a *flight* shall turn in the same direction.

Article 3.4.6.10. Horizontal Exits

1) The *floor area* on each side of a *horizontal exit* shall be sufficient to accommodate the occupants of both *floor areas*, allowing not less than 0.5 m² (5.4 ft²) of clear floor space per person, except that 1.5 m² s(16.2 ft²) shall be provided for each person in a wheelchair and 2.5 m² (27 ft²) for each bedridden patient.

2) If vestibules, enclosed balconies or bridges are used as parts of a *horizontal exit*, their clear width shall be not less than that of the *exit* doorways opening into them, except that handrails are not permitted to project into this clear width more than 100 mm (3 7/8").

3) In a *horizontal exit* where there is a difference in level between the connected *floor areas*, slopes not more than those specified for ramps in Article 3.4.6.7. are permitted to be used.

4) No stairs or steps shall be used in a *horizontal exit*.

5) If 2 doors are provided in a *horizontal exit* that comprises a part of the required number of *exits* from the *floor areas* on both sides of the *exit*
a) the doors shall be mounted adjacent to each other with the door on the right side in the direction of travel through the *horizontal exit* swinging in the direction of travel through the *horizontal exit*, &
b) signs shall be provided on each side of the *horizontal exit* to indicate the door that swings in the direction of travel from that side.
(See Note A-3.4.6.10.(5).)

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A-3.4.6.10.(5) Door Swing. Although it is required that the door on the right hand side of a pair of doors shall swing in the direction of travel through the exit, the direction of swing of the door on the left side will depend on the function of the horizontal exit. If the horizontal exit provides for movement from one building to the adjacent building but does not require movement in the reverse direction, both doors must swing in the direction of travel to the adjacent building. If the design is based upon both buildings providing complementary movement in either direction, then the doors must swing in opposite directions. Location of a required exit sign directly above a door that swings in the direction of travel is deemed to meet the intent of Clause 3.4.6.10.(5)(b).

6) If a *horizontal exit* utilizes bridges between *buildings* or outside balconies, the bridges or balconies shall conform to Article 3.2.3.19.

Article 3.4.6.11. Doors

1) The distance between a stair riser and the leading edge of a door during its swing shall be not less than 300 mm (12").

2) Except as provided in Sentence (3) and where doorways are used to confine the spillage of *flammable liquids* within a *service room* or within a room in an *industrial occupancy*, a threshold for a doorway in an *exit* shall be not more than 13 mm (1/2") higher than the surrounding finished floor surface.

3) Except for doors providing access to ground level as required by Clause 3.3.1.7.(1)(d) and (e), an *exit* door is permitted to open onto not more than one step which shall be not more than 150 mm (6") high where there is a risk of blockage by ice or snow.

4) *Exit* doors shall be clearly identifiable.
(See Note A-3.4.6.11.(4).)

A-3.4.6.11.(4) Exit Concealment. Hangings or draperies placed over exit doors may conceal or obscure them.

5) No door leaf in an *exit* doorway with more than one leaf shall be less than 610 mm (24 1/16") wide.

6) Where an *exit* door leading directly to the outside is subject to being obstructed by parked vehicles or storage because of its location, a visible sign or a physical barrier prohibiting such obstructions shall be installed on the exterior side of the door.

Article 3.4.6.12. Direction of Door Swing

1) Except for doors serving a single *dwelling unit* and except as permitted by Sentence (2) and Article 3.4.6.14., every *exit* door shall
a) open in the direction of *exit* travel, and
b) swing on its vertical axis.

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2) *Exit* doors need not conform to Sentence (1), where
a) they serve *storage garages* serving not more than one *dwelling unit*,
b) they serve accessory *buildings* serving not more than one *dwelling unit*,
c) they
i) serve storage *suites* not more than 28 m² (300 ft²) in area that are on the *first storey* in warehousing *buildings*, and
ii) open directly outdoors at ground level, or
d) they serve individual self-service storage units referred to in Section 3.9.

Article 3.4.6.13. Self-closing Devices
1) An *exit* door that is normally required to be kept closed
a) shall be provided with a self-closing mechanism, and
b) shall never be secured in an open position except as permitted by Sentence 3.1.8.14.(1).

Article 3.4.6.14. Sliding Doors
1) Except as permitted by Sentences (2) and 3.4.6.12.(2), an *exit* door leading directly to outdoors at ground level is permitted to be a sliding door provided it conforms to Sentence 3.3.1.12.(1).

2) An *exit* door serving a Group B, Division 1 *occupancy*, or an *impeded egress zone* in other *occupancies*, is permitted to be a sliding door that does not conform to Sentence 3.3.1.12.(1) provided it is designed to be released in conformance with Article 3.3.1.13.

Article 3.4.6.15. Revolving Doors
1) Except as permitted by Sentence (3), a revolving door, if used, shall
a) be collapsible,
b) have hinged doors providing equivalent exiting capacity located adjacent to it,
c) be used as an *exit* from the ground floor level only,
d) not be used at the foot of any stairway, and
e) have all glass in door leaves and enclosure panels conforming to
    i) CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass," or
    ii) CAN/CGSB-12.11-M, "Wired Safety Glass."

2) Except as permitted by Sentence (3), a revolving door shall not be considered to have an exiting capacity for more than 45 persons.

3) An electrically powered revolving door is not required to conform to Sentences (1) and (2) provided
a) the door leaves will collapse and stop automatic rotation of the door system and not obstruct the doorway if a force not more than that specified in Sentence 3.4.6.16.(2) is applied at the centre of a door leaf,
b) the door leaves are capable of being opened from inside the *building* without requiring keys, special devices, or specialized knowledge of the door opening mechanism,

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c) the allowable exiting capacity is based on the clear width of passage through the door enclosure when the doors are fully collapsed,
d) a permanent sign, whose centre line is between 1 000 mm (3'-3") and 1 500 mm (5') above the floor, is placed on each face of each door leaf indicating the method for collapsing the door leaf in an emergency, and
e) glass used for door leaves and enclosure panels is safety glass conforming to
i) CAN/CGSB-12.1-M, "Tempered or Laminated Safety Glass," or
ii) CAN/CGSB-12.11-M, "Wired Safety Glass."

Article 3.4.6.16. Door Release Hardware
1) Except for devices on doors serving a *contained use area* or an *impeded egress zone* designed to be remotely released in conformance with Article 3.3.1.13., and except as permitted by Sentences (4) and (5) and Article 3.4.6.17., locking, latching and other fastening devices on a principal entrance door to a *building* as well as those on every *exit* door shall include release hardware complying with Clause 3.8.3.8.(1)(b) to permit the door to be readily opened from the inside with not more than one releasing operation and without requiring keys, special devices or specialized knowledge of the door-opening mechanism. (See Note A-3.4.6.16.(1).)
A-3.4.6.16.(1) Fastening Device. Turnpieces of a type which must be rotated through an angle of more than 90° before releasing a locking bolt are not considered to be readily openable. The release of a locking bolt should allow the door to open without having to operate other devices on the door.

2) If a door is equipped with a latching mechanism, a device that will release the latch and allow the door to swing wide open when a force of not more than 90 N is applied to the device in the direction of travel to the *exit* shall be installed on
a) every *exit* door from a *floor area* containing an *assembly occupancy* having an *occupant load* more than 100,
b) every door leading to an *exit* lobby from an *exit* stair shaft, and every exterior door leading from an *exit* stair shaft in a *building* having an *occupant load* more than 100, and
c) every *exit* door from a *floor area* containing a *high-hazard industrial occupancy*.

3) Except as required by Sentence 3.8.3.6.(8), every *exit* door shall be designed and installed so that, when the latch is released, the door will open under a force of not more than 90 N, applied at the knob or other latch releasing device.

4) Electromagnetic locks that do not incorporate latches, pins or other similar devices to keep the door in the closed position are permitted to be installed on doors, other than those leading directly from a *high-hazard industrial occupancy*, provided
a) the *building* is equipped with a fire alarm system,
b) the locking device releases upon actuation of the *alarm signal* from the *building*'s fire alarm system,
c) the locking device releases immediately upon loss of power controlling the electromagnetic locking mechanism and its associated auxiliary controls,

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d) except for locking devices installed in conformance with Sentence (5), the locking device releases immediately upon actuation of a manually operated switch readily accessible only to authorized personnel,
e) except as provided in Clause (k), a force of not more than 90 N applied to the door opening hardware initiates an irreversible process that will release the locking device within 15 s and not re-lock until the door has been opened,
f) upon release, the locking device must be reset manually by the actuation of the switch referred to in Clause (d),
g) a legible sign is permanently mounted on the door to indicate that the locking device will release within 15 s of applying pressure to the door-opening hardware,
h) the total time delay for all electromagnetic locks in any path of egress to release is not more than 15 s,
i) where a bypass switch is installed to allow testing of the fire alarm system, actuation of the switch
    i) can prevent the release of the locking device by the fire alarm system, as stated in Clause (b), during the test, and
    ii) causes an audible and visual signal to be indicated at the fire alarm annunciator panel required by Article 3.2.4.9. and at the monitoring station specified in Sentence 3.2.4.8.(4),
j) emergency lighting is provided at each door, and
k) where they are installed on doors providing emergency crossover access to *floor areas* from *exit* stairs in accordance with Article 3.4.6.18.,
    i) the locking device releases immediately upon the operation of a manual station for the fire alarm system located on the wall on the *exit* stair side not more than 600 mm (24") from the door, and
    ii) a legible sign with the words "re-entry door unlocked by fire alarm" written in letters at least 25 mm (1") high with a stroke of at least 5 mm (3/16") is permanently mounted on the door on the *exit* stair side.

(See Note A-3.4.6.16.(4).)

A-3.4.6.16.(4) Electromagnetic Lock. Electromagnetic locks are intended for use where there is a need for security additional to that provided by traditional exit hardware. They are not intended for indiscriminate use as alternative locking devices. The design of these devices requires evaluation to ensure that their operation will be fail-safe in allowing exiting in the event of foreseeable emergencies. If more than one locking device is used in a building, it is expected that one switch will release and reset all devices simultaneously.

5) Electromagnetic locks that do not incorporate latches, pins or other similar devices to keep the door in the closed position are permitted to be installed on doors in Group B, Division 2 and Division 3 *occupancies*, provided
a) the *building* is
    i) equipped with a fire alarm system, and
    ii) *sprinklered*,
b) the electromagnetic lock releases upon
    i) actuation of the *alarm signal* from the *building*'s fire alarm system,
    ii) loss of its power supply and of power to its auxiliary controls,

iii) actuation of a manually operated switch that is readily accessible at a constantly attended location within the locked space, and
iv) actuation of the manual station installed within 0.5 m (19.5") of each door and equipped with an auxiliary contact, which directly releases the electromagnetic lock,
c) upon release, the electromagnetic lock requires manual resetting by actuation of the switch referred to in Subclause (b)(iii),
d) a legible sign with the words "EMERGENCY EXIT UNLOCKED BY FIRE ALARM" written in letters at least 25 mm (1") high with a stroke at least 5 mm (3/16") wide is permanently mounted on the door,
e) the operation of any by-pass switch, where provided for testing of the fire alarm system, sets off an audible signal and a visual signal at the fire alarm annunciator panel and at the monitoring station referred to in Sentence 3.2.4.7.(4), and
f) emergency lighting is provided at the doors.
(See Note A-3.4.6.16.(5).)

A-3.4.6.16.(5) Electromagnetic Locks in Care and Treatment Occupancies. The installation of electromagnetic locks in care and treatment occupancies requires special provisions to address the compromised condition of residents and the nature of daily operations. Accordingly, to reduce the incidence of false operation by residents, transparent boxes that set off an audible signal when opened can be installed to cover the manual stations. Also, one optional additional release device (e.g. swipe card device, key pad) can be installed to facilitate the free movement of staff and visitors in the building.

6) Door hardware for the operation of the doors referred to in this Section shall be installed at a height not more than 1 200 mm (48") above the finished floor.

Article 3.4.6.17. Security for Banks and Mercantile Floor Areas

1) If a *building* is *sprinklered* throughout, the requirements of Sentence 3.4.6.16.(1) are permitted to be waived for *exit* and egress doors complying with Sentences (2) to (9) that serve a *floor area* or part of a *floor area* used exclusively for
a) a bank, or
b) the sale of retail merchandise.
(See Note A-3.4.6.17.(1).)

A-3.4.6.17.(1) Special Security for Doors. The need for security in banks and in mercantile occupancies requires the ability to use positive locking devices on doors that may not readily be opened from inside the building. In a fully sprinklered building, the risk to persons inside the building is substantially reduced. The provisions of Sentences 3.4.6.17.(2) to (9) assume that the area is illuminated and that a means of communication is available to any occupant during times that the doors are locked.

2) *Exit* and egress doors referred to in Sentence (1) shall be designed to prevent locking at any time that the part of the *floor area* that they serve is open to the public.

3) A sign with the words "This door shall not be locked at any time that the public is present" in letters not less than 50 mm (2") high shall be permanently affixed to both sides of doors referred to in Sentence (1).

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4) *Exit* and egress facilities complying with Sentences (5) to (9) shall be incorporated for egress by persons other than the public from a *floor area* or a part of a *floor area* referred to in Sentence (1) during times when the public is neither present nor being admitted to the area that they serve.

5) In *exit* and egress facilities referred to in Sentence (4), at least one door at each *exit* and egress location shall
a) be operable in conformance with Sentence 3.4.6.16.(1), or
b) be equipped with locks conforming to Sentence 3.4.6.16.(4) that release immediately
    i) if an *alert signal* or *alarm signal* is initiated in the fire alarm system, or
    ii) the sprinkler system is actuated.

6) A door referred to in Sentence (5) shall be permanently and distinctly marked to indicate that it is an emergency *exit*.

7) *Exit* and egress facilities required for evacuation of persons other than the public from a *floor area* or a part of a *floor area* referred to in Sentence (1) shall have an aggregate width based on the maximum number of persons other than the public and determined in accordance with Articles 3.4.3.1. to 3.4.3.3.

8) Travel distance to an *exit* referred to in Sentence (7) shall not exceed the travel distance determined in accordance with Subsection 3.4.2.

9) *Exit* and egress doors serving a *floor area* or part of a *floor area* referred to in Sentence (1) are permitted to be equipped with locks that require keys, special devices or specialized knowledge of the door opening mechanism provided
a) the doors do not lead into *exit* stairs,
b) the doors do not lead from *exit* stairs to the exterior of the *building*,
c) the doors do not serve any other *occupancy*,
d) the area served contains at least one telephone
    i) that is accessible and in operation at all times,
    ii) that is not coin or card operated, and
    iii) marked to indicate that it is for emergency use,
e) the area served is illuminated by normal power or by emergency power when the doors are locked,
f) there are provisions that enable an announcement to be made throughout the area served before the locks are fastened, and
g) the locks are designed for use during times that the *building* is not occupied.

Article 3.4.6.18. Emergency Crossover Access to Floor Areas
1) Except as permitted in Sentence (2), doors providing access to *floor areas* from *exit* stairs shall not have locking devices to prevent entry into any *floor area* from which the travel distance up or down to an unlocked door is more than 2 *storeys*.

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2) Doors referred to in Sentence (1) are permitted to be equipped with electromagnetic locks, provided they comply with Sentences 3.4.6.16.(4) and (5).

3) Doors referred to in Sentence (1) shall be identified by a sign on the stairway side to indicate that they are openable from that side.

4) Locked doors intended to prevent entry into a *floor area* from an *exit* stair shall
a) be identified by a sign on the stairway side to indicate the location of the nearest unlocked door in each direction of travel, and
b) be openable with a master key that fits all locking devices and is kept in a designated location accessible to firefighters or be provided with a wired glass panel not less than 0.0645 m2 (0.695 ft²) in area and located not more than 300 mm (12") from the door opening hardware.

5) Where access to *floor areas* through unlocked doors is required by Sentence (1), it shall be possible for a person entering the *floor area* to have access through unlocked doors within the *floor area* to at least one other *exit*.

Article 3.4.6.19. Floor Numbering
1) Arabic numerals indicating the assigned floor number shall
a) be mounted permanently on the stair side of the wall at the latch side of doors to *exit* stair shafts,
b) be not less than 60 mm (2 3/8") high, raised approximately 0.7 mm (1/32") above the surface,
c) be located 1 500 mm (5') from the finished floor and not more than 300 mm (12") from the door, and
d) be contrasting in colour with the surface to which they are applied (see Note A-3.4.6.19.(1)(d)).

A-3.4.6.19.(1)(d) Colour Contrast. The identification of floor and other signs intended to facilitate orientation for visually-impaired persons should offer maximum colour contrast to be effective. For this reason, it is recommended that white on black or black on white be used, as this combination produces the best legibility. It is also recommended that the sign surfaces be processed to prevent glare.

In Summary

This Advisory #3 includes a summary of the applicable Part 3, 2015 NBC provisions for the construction of Stairs, Barrier-Free Ramps, Handrails, and Guards in all buildings that are governed under Part 3 of the 2015 NBC.

For the construction of stairs, handrails and guards for single family dwellings or a house with a secondary suite only, please consult Advisory #1.

For the construction of Stairs, Barrier-Free Ramps, Handrails, and Guards for all other Part 9 buildings, please consult Advisory #2 as it deals with the construction of Stairs, Barrier-Free Ramps, Handrails, and Guards for all other Part 9 buildings.